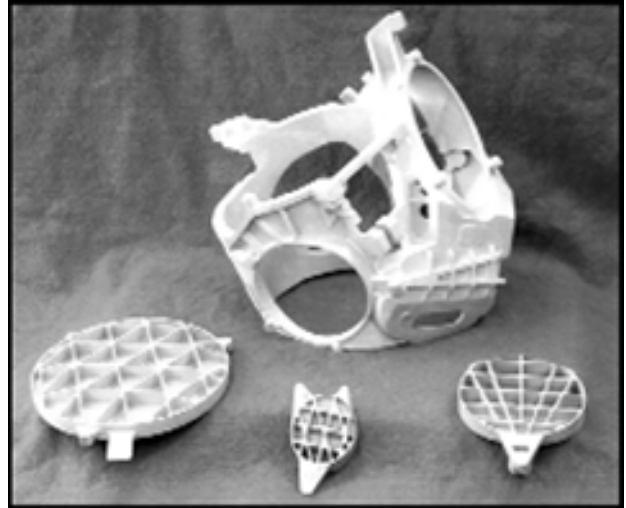


O'Fallon Casting's Process, Casting Complexity, and Unique Material Combine to Satisfy Customer Needs

The accompanying photograph depicts an Afocal Housing and related mirrors used by Lockheed Martin on an EOSS, Targeting System for a Military Helicopter. The unique material was a Silicon Carbide Metal Matrix Composite (SiC MMC) cast to near net shape by O'Fallon Casting utilizing their countergravity casting techniques.

Due to both time and cost restraints, and compounded by the high probability of future design changes, it was necessary to produce the complex 14" x 16" x 17" afocal housing from SLA (stereolithography) patterns. The afocal housing mates with the three SiC MMC high quality mirrors which were also cast by O'Fallon Casting. It was critical that all parts be produced in the same alloy to maintain a constant CTE (Coefficient of Thermal Expansion).



The following comments were furnished by Lockheed's Program Procurement Manager.

"In order to push the state-of-the-art stand-off ranges and perform under temperature extremes encountered by the modern warfighter on it's EOSS Targeting System, Lockheed Martin needed an extremely stiff mirror set and thermally matched housing for the afocal subassembly. Achieving the near perfect optical wavefront error meant aluminum mirrors were too flimsy, sagging under their own weight. Beryllium would have provided the required stiffness, but thermally matching the housing meant a Beryllium afocal housing hogout, which would have been cost prohibitive, if it could be done at all in the large complex housing geometry. The SiC MMC mirrors and housings provide the stiffness, thermal match and castability."

O'Fallon Casting accepted this challenging project.

Three factors make the part unique.

- The casting was produced from SLA patterns. It was necessary to CAD/CMM inspect the patterns and the castings, both before and after heat treatment, to verify dimensional accuracy.
- The material was a Silicon Carbide Metal Matrix Composite (SiC MMC). O'Fallon Casting is the major producer of SiC MMC investment castings.
- The casting was produced utilizing our countergravity casting techniques which has proven to be the process of choice for this family of alloys. This process excels in casting highly viscous alloys and provides a well-controlled casting method with minimal metal turbulence.

Silicon Carbide Metal Matrix Composites are routinely cast by O'Fallon Casting with SiC concentrations of up to 40%. 20 and 30% are more commonly required and specified by our customers.

We, and our customer, are pleased to have participated so successfully on this very critical application.

